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This document consists of 1 page and is numbered 2 of 11, series 7, and the following attachments.

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November 26, 1952

Dear 

Subj: Proposal No. 10199

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AUTH: HR 70-2
DATE: 7/10/01 REVIEWER: 037169

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I am writing with reference to our conversation regarding the study and development of a small highly portable delayed action transmitter. In accordance with your suggestion, I should like to propose that we undertake a fixed price study program to investigate the feasibility of this concept and make recommendations for a continuing development program if such are warranted. We estimate that a study program of this sort can be completed in six months at a total cost, including our fee, of \$9,500.

We propose to study the technical and tactical problems of developing and using a light weight portable radio transmitting system for the delayed transmission of messages from hostile to friendly territory. We propose to concentrate primarily on short range transmission of 25 to 100 miles but we will also give consideration to some of the problems involved in extending the transmission range.

Initially two basic types of system will be considered. First, a time delay transmitter which can be manually set up on a prominence with suitable mechanisms to activate and transmit a previously inserted message after a suitable time delay for the operator to leave the vicinity.

Second, we will consider the problem of a balloon borne transmitter which will be activated and transmit its message upon reaching a high altitude. Other types of systems will be considered as they are developed through the process of the study program.

We would propose to start this program by studying the various types of problems that your people have or can

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visualize. We specifically would not, however, be limited or restricted by these requirements during the study program. Such information would be used to guide the technical thinking toward practical and useable end results but we would not propose to allow these desires to dictate the direction of the technical study. Prime consideration will have to be given to weight, volume, reliability and simplicity.

In addition, since this concept involves disposable units, economy in manufacture will be of the greatest importance. Here we will want to investigate the adaptation of all new developments in printed circuitry, low cost and miniature tubes and inexpensive single use power supplies. Other technical problems which will require other study and evaluation include the data and message input equipment, the transmitter itself, optimum operating frequencies, antenna design, power supplies, time delay and destructors, if desirable.

The method of data or message input will be carefully studied with consideration being given to both coded and clear oral input. For coded input consideration will be given to simple methods of coding so as to eliminate the problem of teaching a special code to operators. Punched paper tape, magnetic tape, bead strings and other methods suitable for unattended operations will be studied. The advantages of high speed versus normal speed transmission will be considered.

A transmitter designed for battery power operation is anticipated. Primary emphasis will be placed on the study of optimum transmitter design. The choice of circuit design, component parts and operating power levels will determine the over-all size, reliability and efficiency of the system. The transmitter design will determine the size of the power supplies, the radiated power and the ruggedness and reliability of the system. In conjunction with studies of transmitter design, the choice of operating frequencies will also be carefully investigated in the light of operating range, antenna length, propagation characteristic, etc.

The choice of antenna is considered important in determining the over-all efficiency of the system in terms of radiated power. The choice of frequency and operating range must be considered in choosing the antenna. The conditions under which the system is used will have an important bearing on antenna length, ease of erection, danger from detection, etc.

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The choice of power supplies is second only to the design of the transmitter in determining size, weight and reliability of the system. A power supply designed for long storage life, simple activation and ample power for the required operating period is necessary.

The time delay and destructor mechanisms should be quite straightforward with the choice of units depending largely on the type of activation, period of operation and similar over-all operational characteristics. The balloon borne system will probably utilize altitude pressure activation. Time delay will also be considered, however, for the balloon system.

In conjunction with the study of the balloon transmitting system, consideration will be given to the type of balloon and gas generating auxiliary equipment that will be required as part of the over-all system. Both rubber and plastic balloons will be evaluated.

The end result of the study contract will be the delivery of a report covering all findings, evaluations, test results and recommendations. If in our opinion the development appears promising a program for continuing development work will be recommended. The final report would be delivered six months after receipt of authorization to commence work. Monthly progress reports in letter form would be submitted covering significant progress during the period.

It is expected that a certain amount of experimental work would be required to establish the feasibility of certain specific items. This experimental work would be done as required.

I believe our electronic staff is well qualified to undertake this work for you. We are well equipped with the necessary laboratory and library facilities. Our recent experience in designing and developing radio equipment having similar design and operational requirements for use on high altitude balloons is a valuable background especially for the propagation phases of the study. This equipment includes radio telemetering systems for providing balloon performance data, radio control links for the remote control of a balloon and its associated equipment and the design, installation and operation of an Adcock type radio direction finding network. Problems in radio propagation, antenna design, light weight high efficiency transmitters, battery power supplies, and simplicity and reliability of design, and accurate receipt of intelligence from very low power transmitters were encountered in these problems.

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Our present staff will be further strengthened by the addition of [] in the very near future. While at the National Bureau of Standards, [] was in charge of their project for the development of the proximity fuse and has had extensive experience in the design and manufacture of miniature, subminiature and printed circuit electronic components.

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I sincerely hope that this proposal meets with your approval for we are very anxious to undertake this work for you.

Sincerely yours,

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